

Fig. 1

FIG. 2

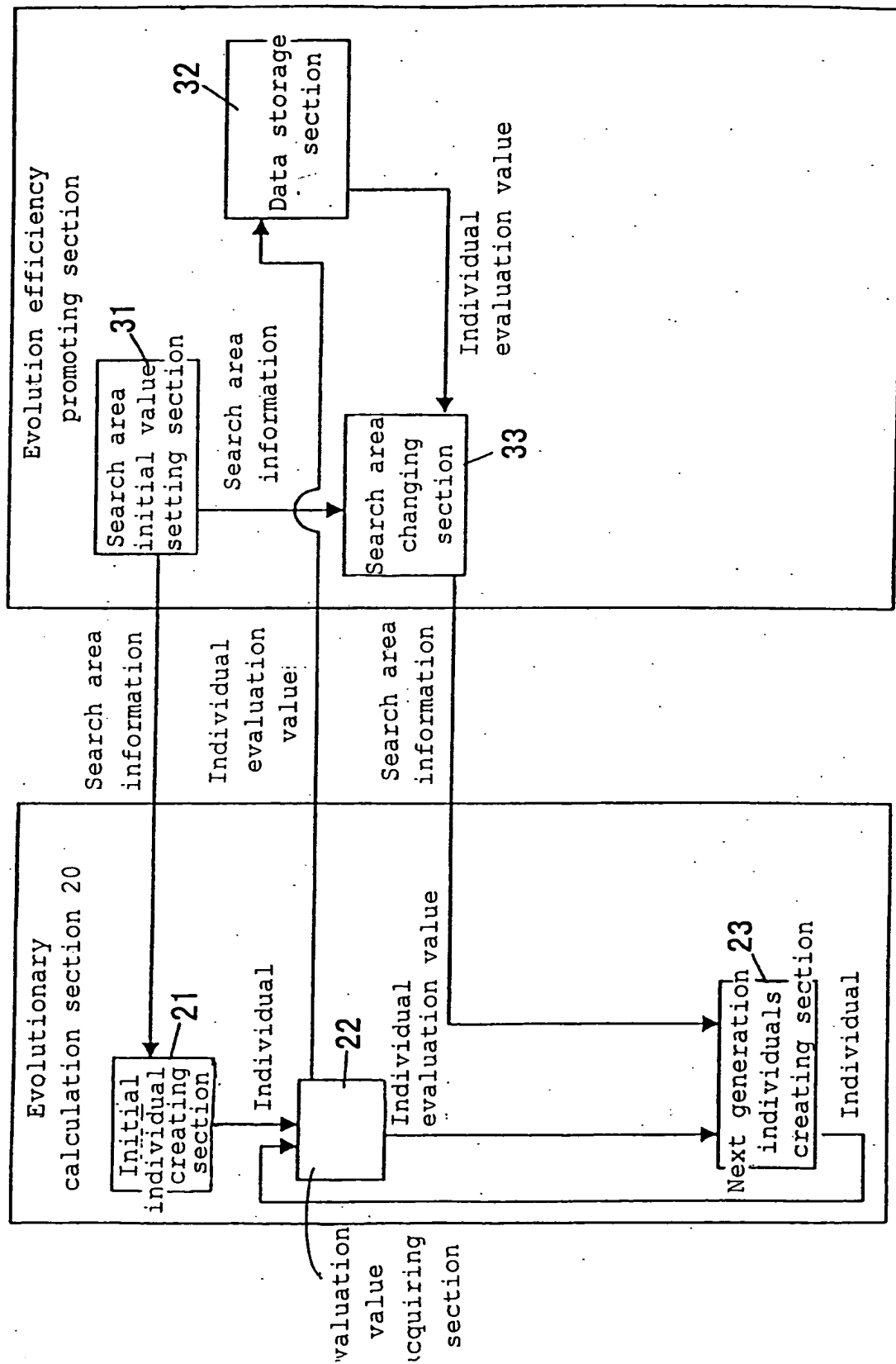
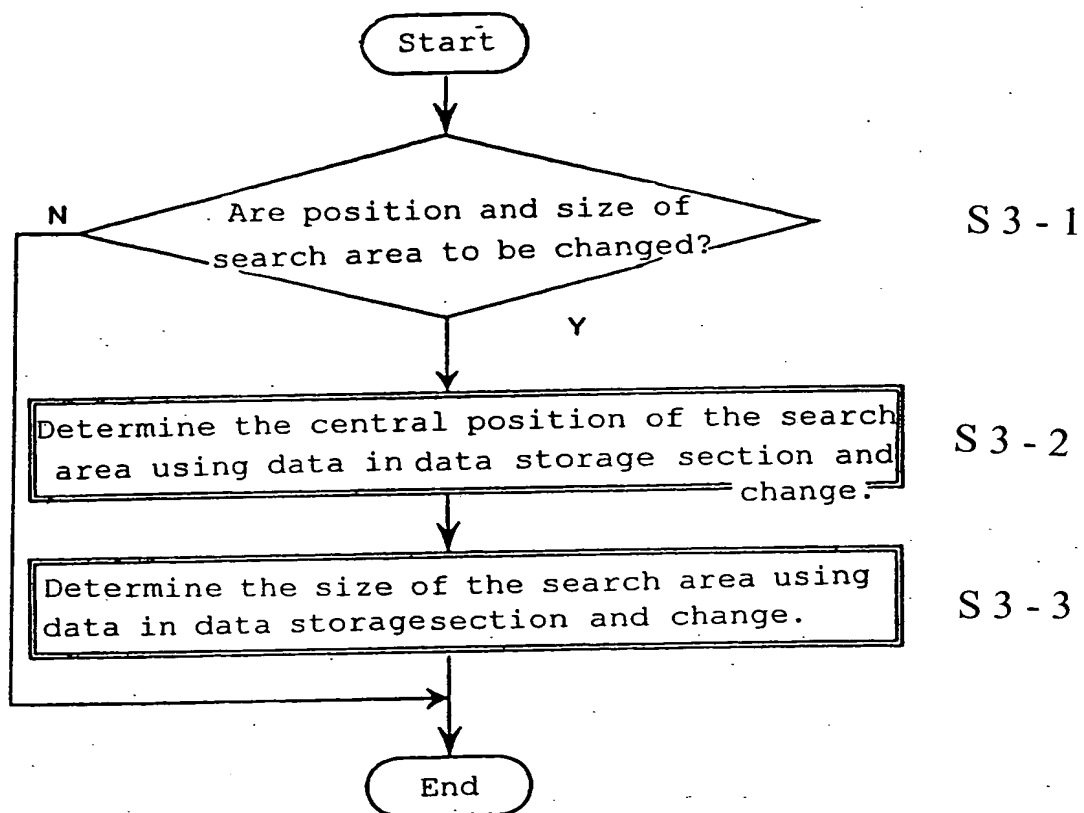


FIG. 3



① Change based on current size

Best evaluation value Y of i -th generation	Search area size (Amount of change in center-to-edge distance)
$0 \leq Y < 20$	+20
$20 \leq Y < 40$	+10
$40 \leq Y < 70$	0
$70 \leq Y \leq 100$	-10

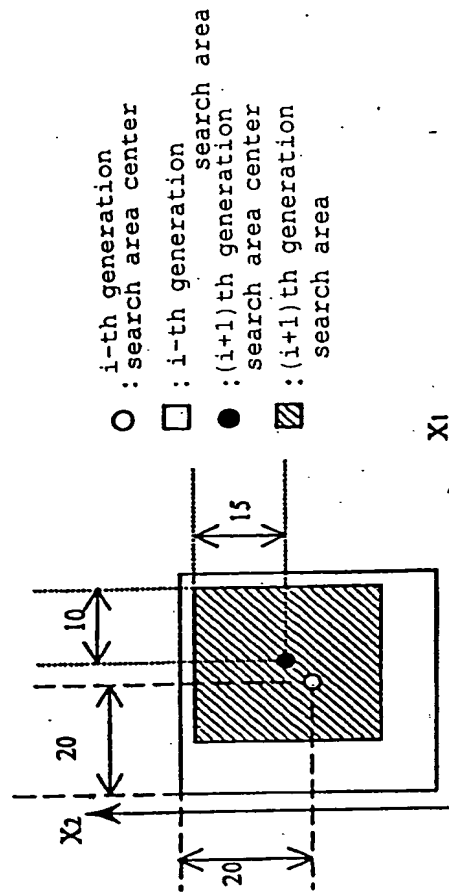


FIG. 4A(a)

FIG. 4A(b)

② Change irrespective of current size

Best evaluation value Y of i -th generation	Search area size (Amount of change in center-to-edge distance)
$0 \leq Y < 20$	25
$20 \leq Y < 40$	20
$40 \leq Y < 70$	15
$70 \leq Y \leq 100$	10

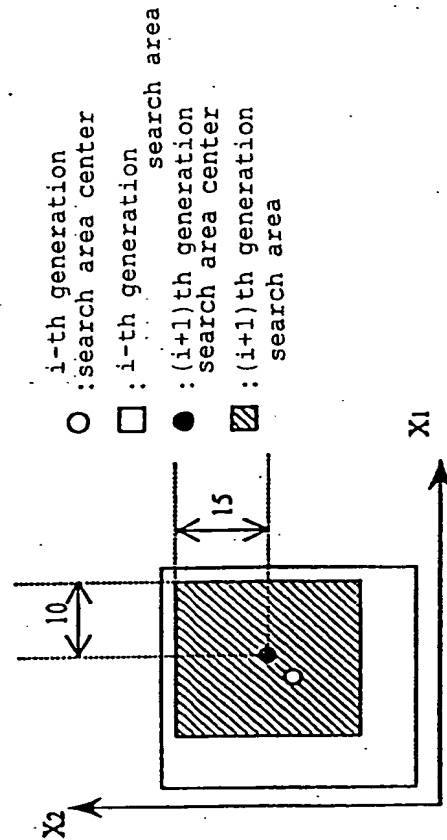


FIG. 4B(a)

FIG. 4B(b)

① Change based on current size

Shift distance (d) of search area center position	Search area size (Amount of change in center-to-edgedistance) X1 direction X2 direction
$60 \leq d$	+20 +10
$40 \leq d < 60$	+10 +5
$20 \leq d < 40$	0 0
$0 \leq d < 20$	-10 -5

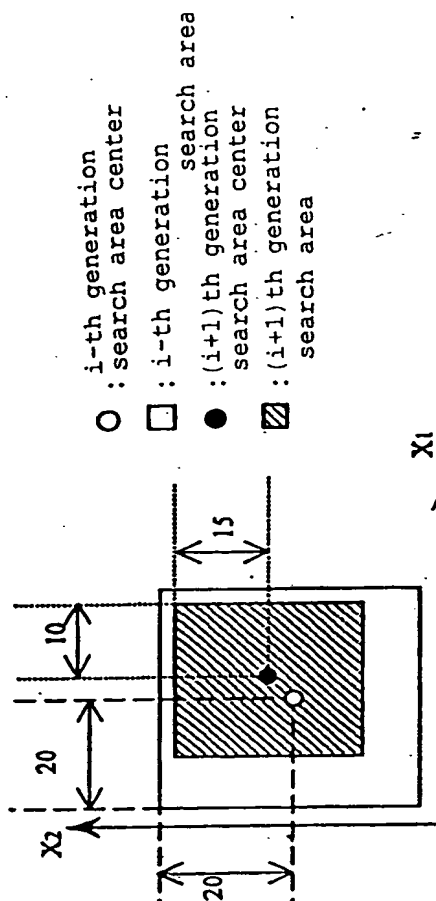


FIG. 5A(a)

FIG. 5A(b)

② Change irrespective of current size

Shift distance (d) of search area center position	Search area size (Amount of change in center-to-edgedistance) X1 direction X2 direction
$60 \leq d$	25 30
$40 \leq d < 60$	20 25
$20 \leq d < 40$	15 20
$0 \leq d < 20$	10 15

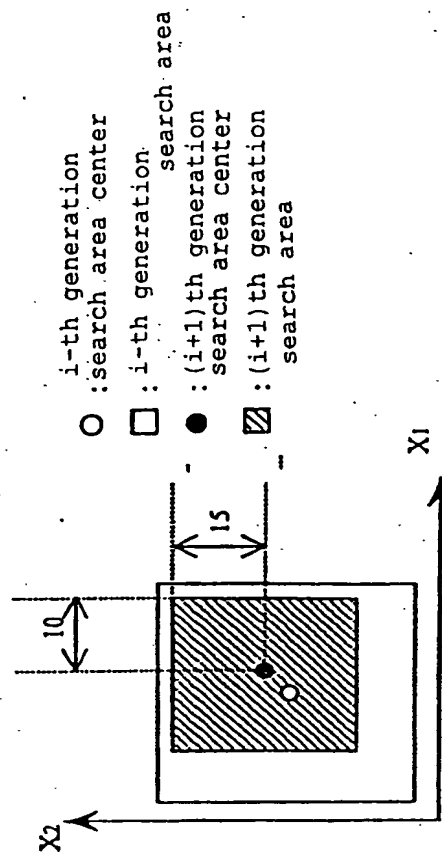


FIG. 5B(a)

FIG. 5B(b)

- : i-th generation search area center
- : i-th generation search area
- : (i+1)th generation search area center
- ▨ : (i+1)th generation search area

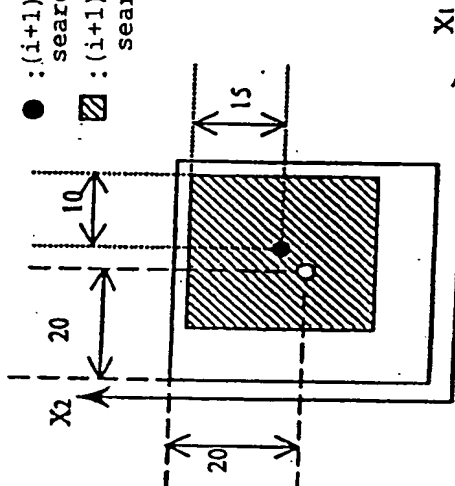


FIG. 6A(b)

① Change based on current size

Center position of next generation search area in current search area	Search area size (Amount of change in center-to-edge distance)
In area from 75% to 100%	X1 direction X2 direction +20 +10
In area from 50% to 75%	+10 +5
In area from 25% to 50%	0 0
In area from 0% to 25%	-10 -5

FIG. 6A(a)

② Change irrespective of current size

Center position of next generation search area in current search area	Search area size (Amount of change in center-to-edge distance)
In area from 75% to 100%	25 30
In area from 50% to 75%	20 25
In area from 25% to 50%	15 20
In area from 0% to 25%	10 15

FIG. 6B(a)

- : i-th generation search area center
- : i-th generation search area
- : (i+1)th generation search area center
- ▨ : (i+1)th generation search area

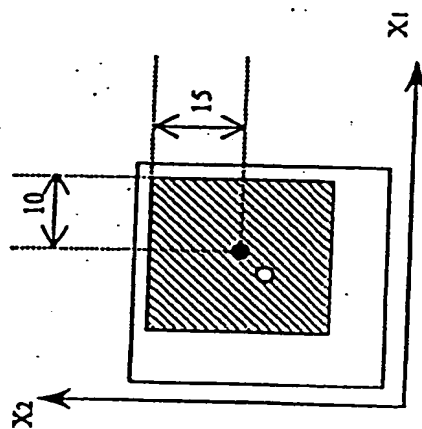


FIG. 6B(b)

FIG. 7

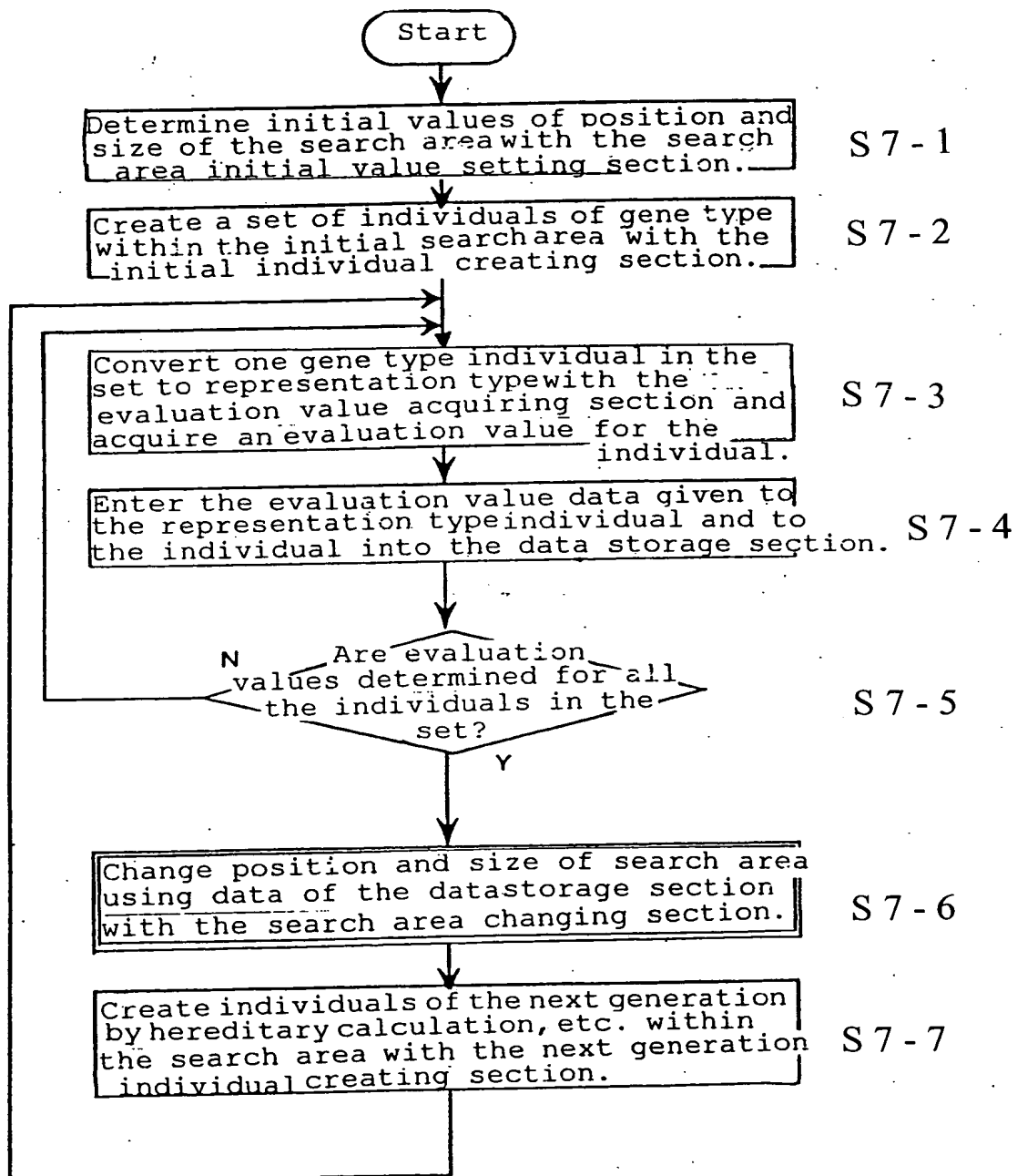


FIG. 8

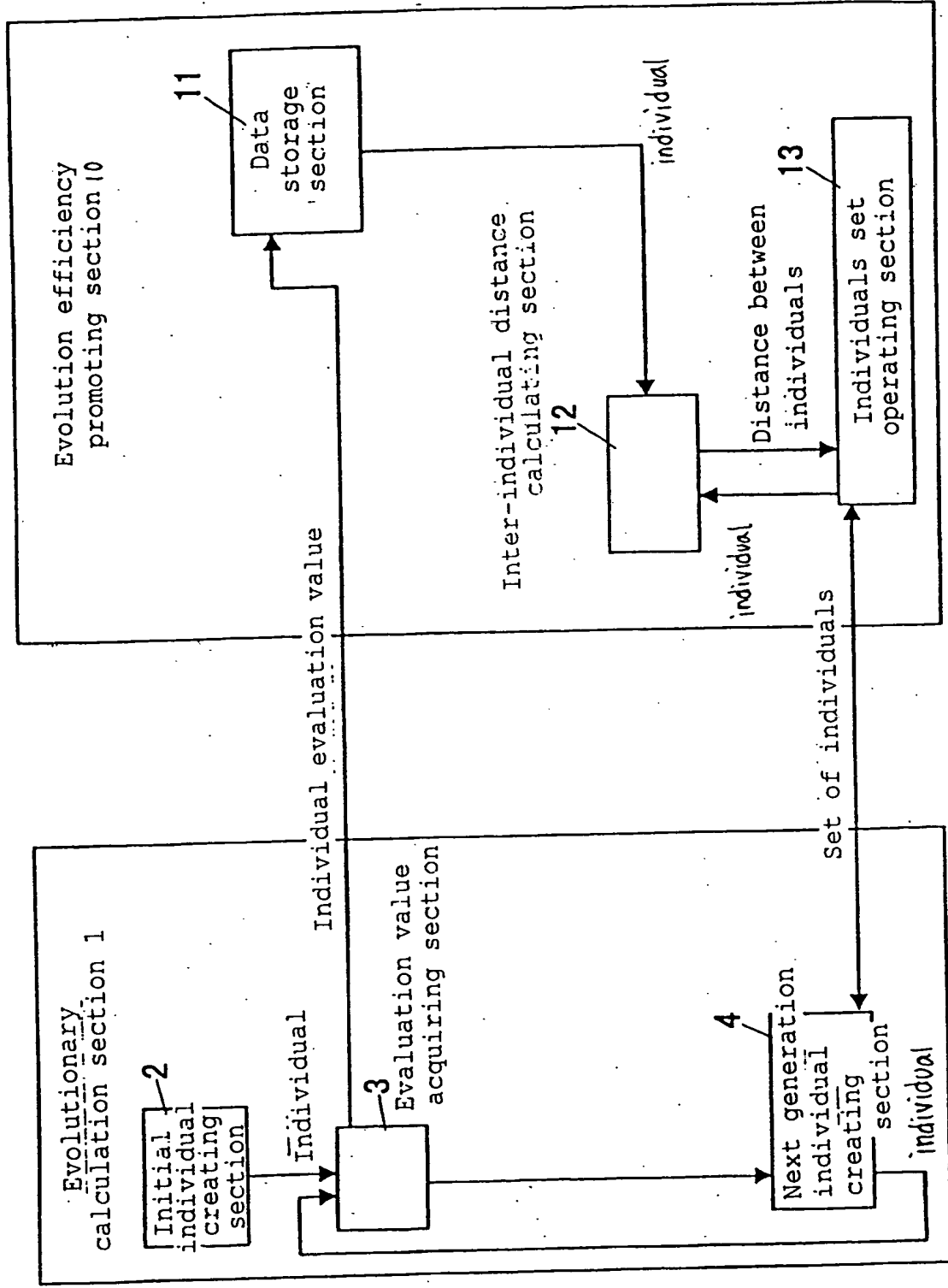


FIG. 9

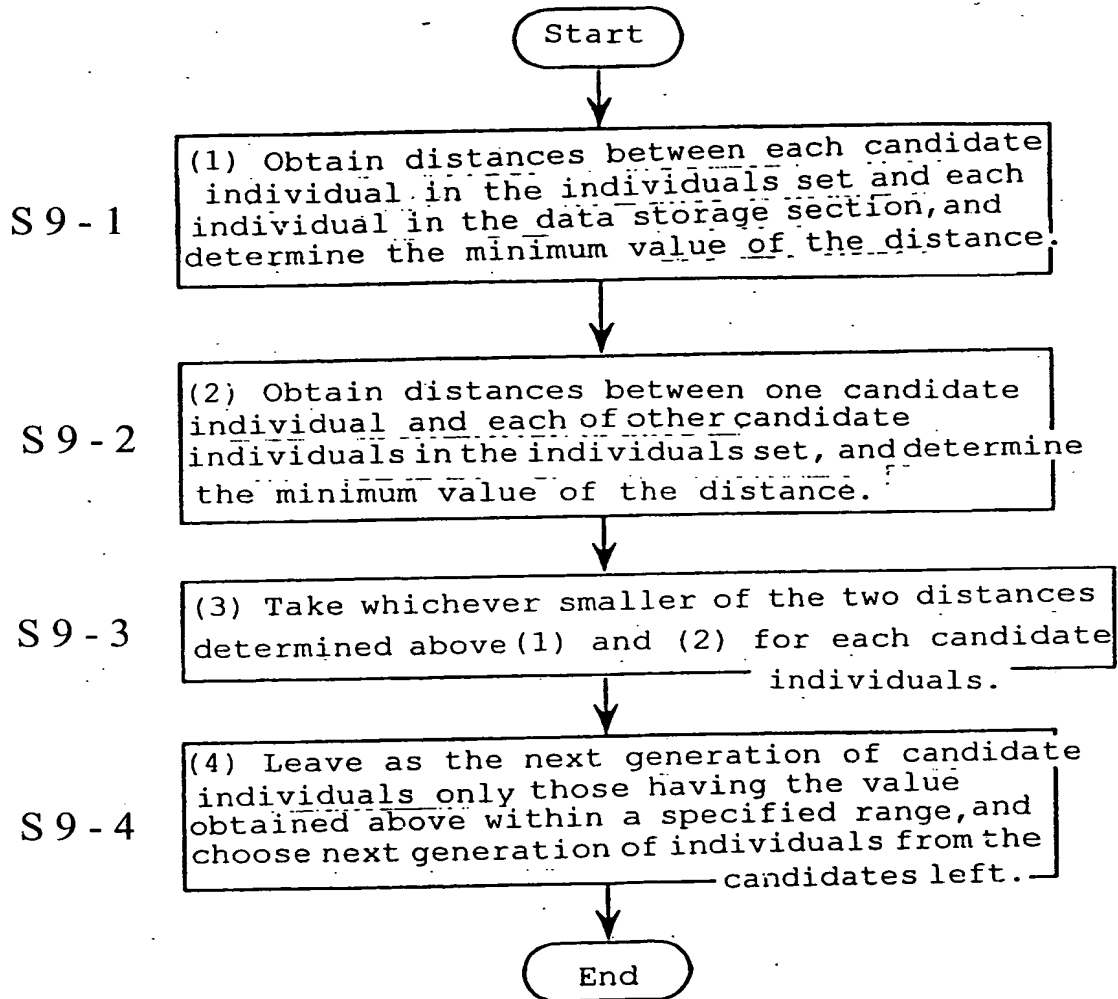


FIG. 10(a)

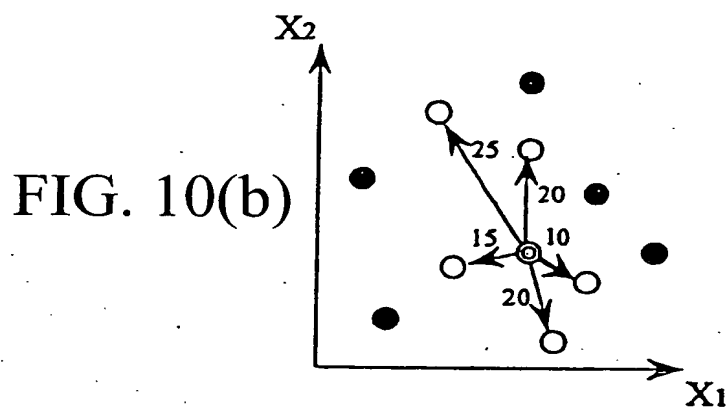
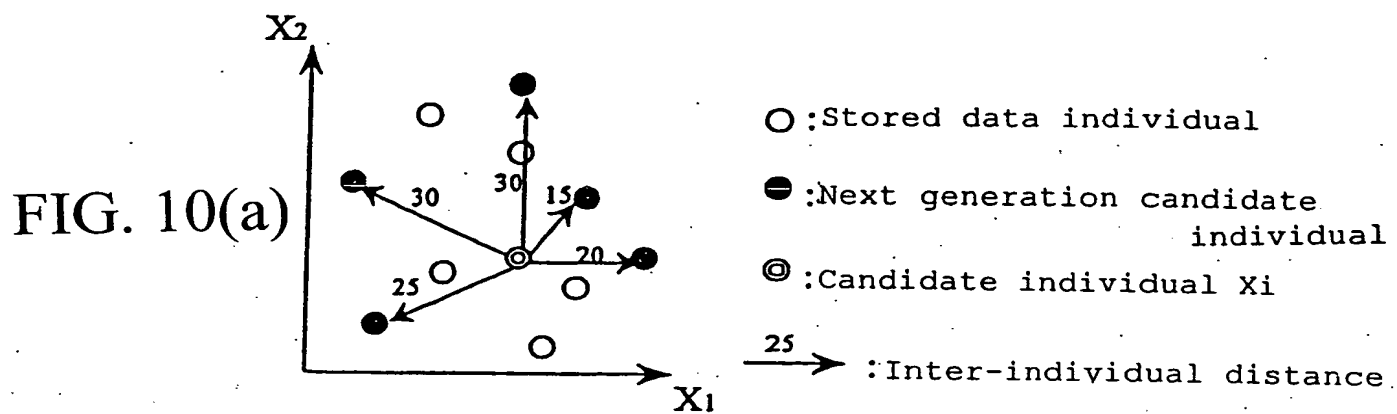


FIG. 11

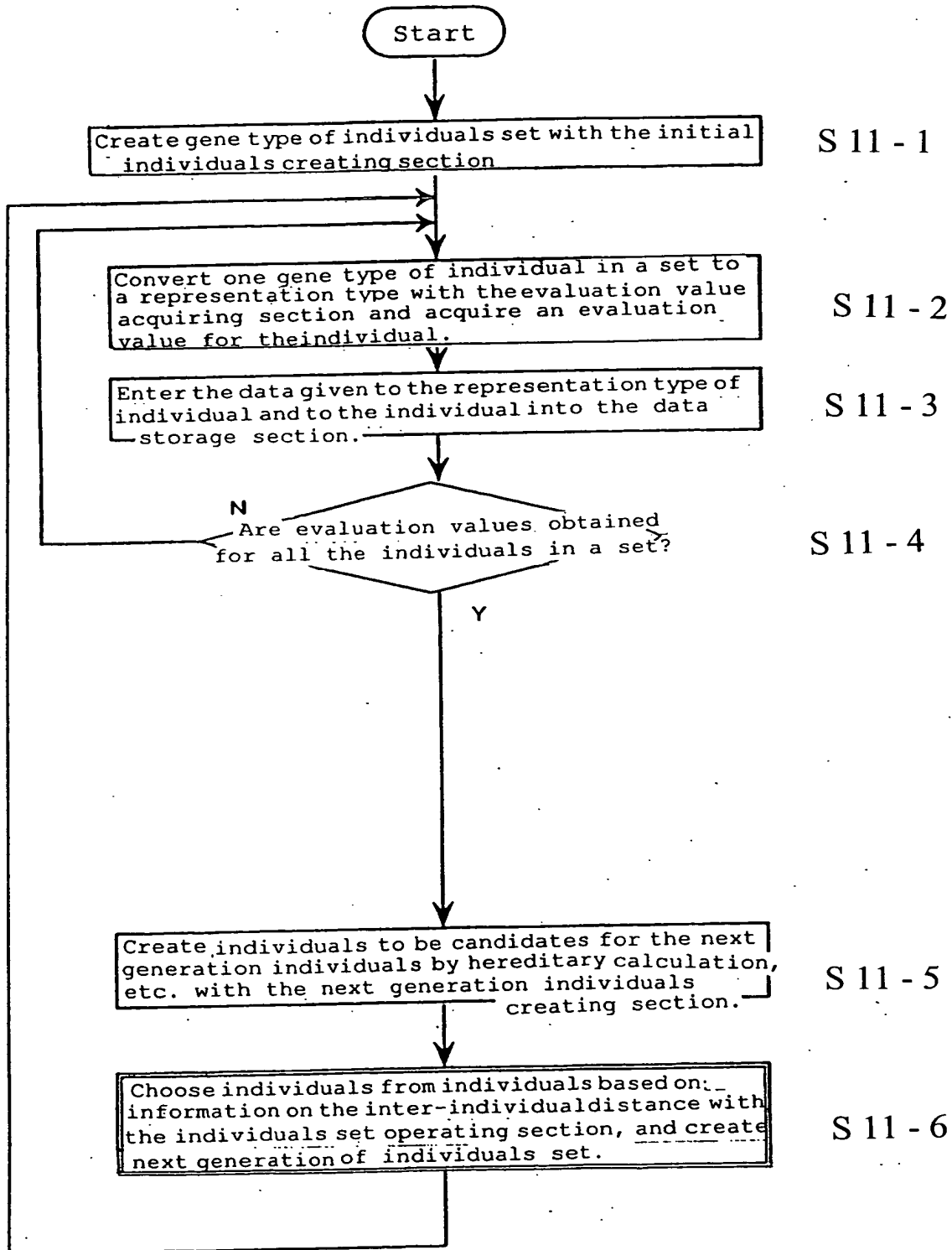


FIG. 12

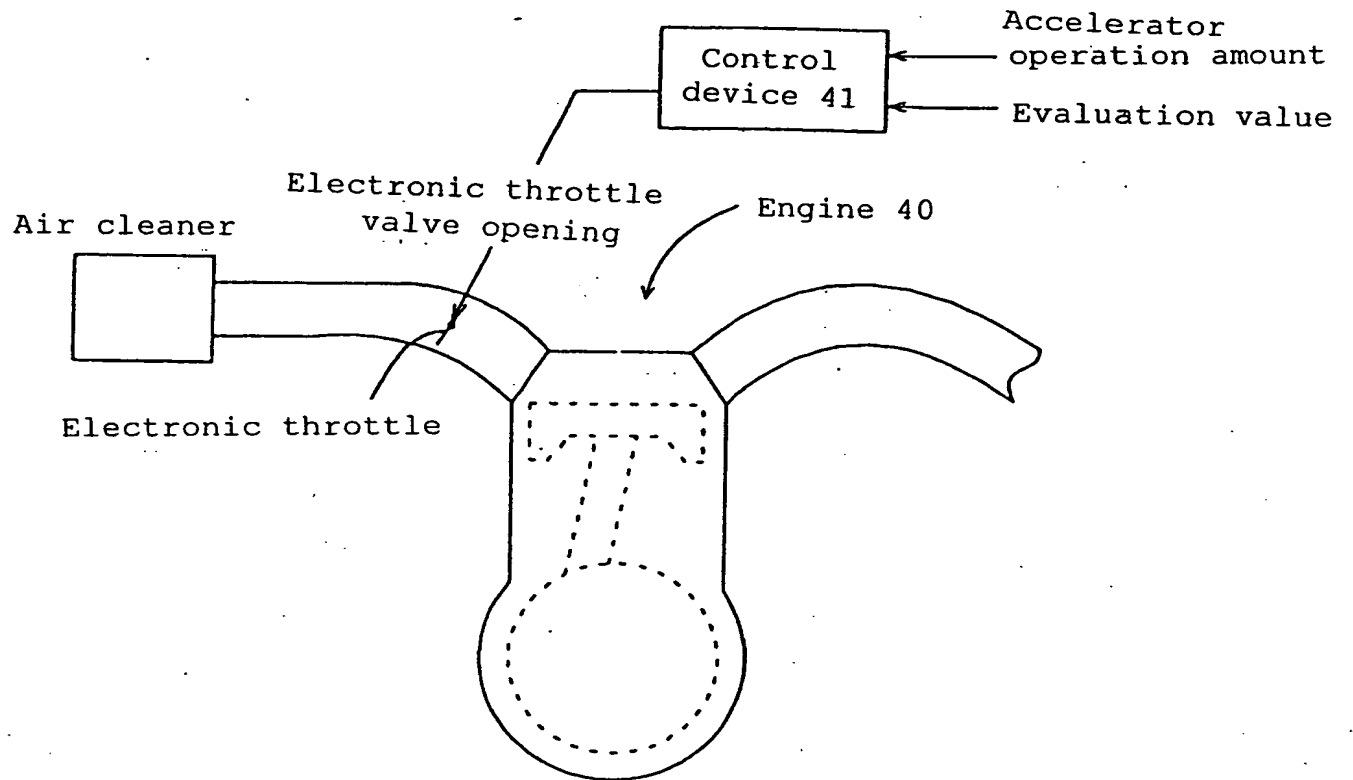


FIG. 12

FIG. 13

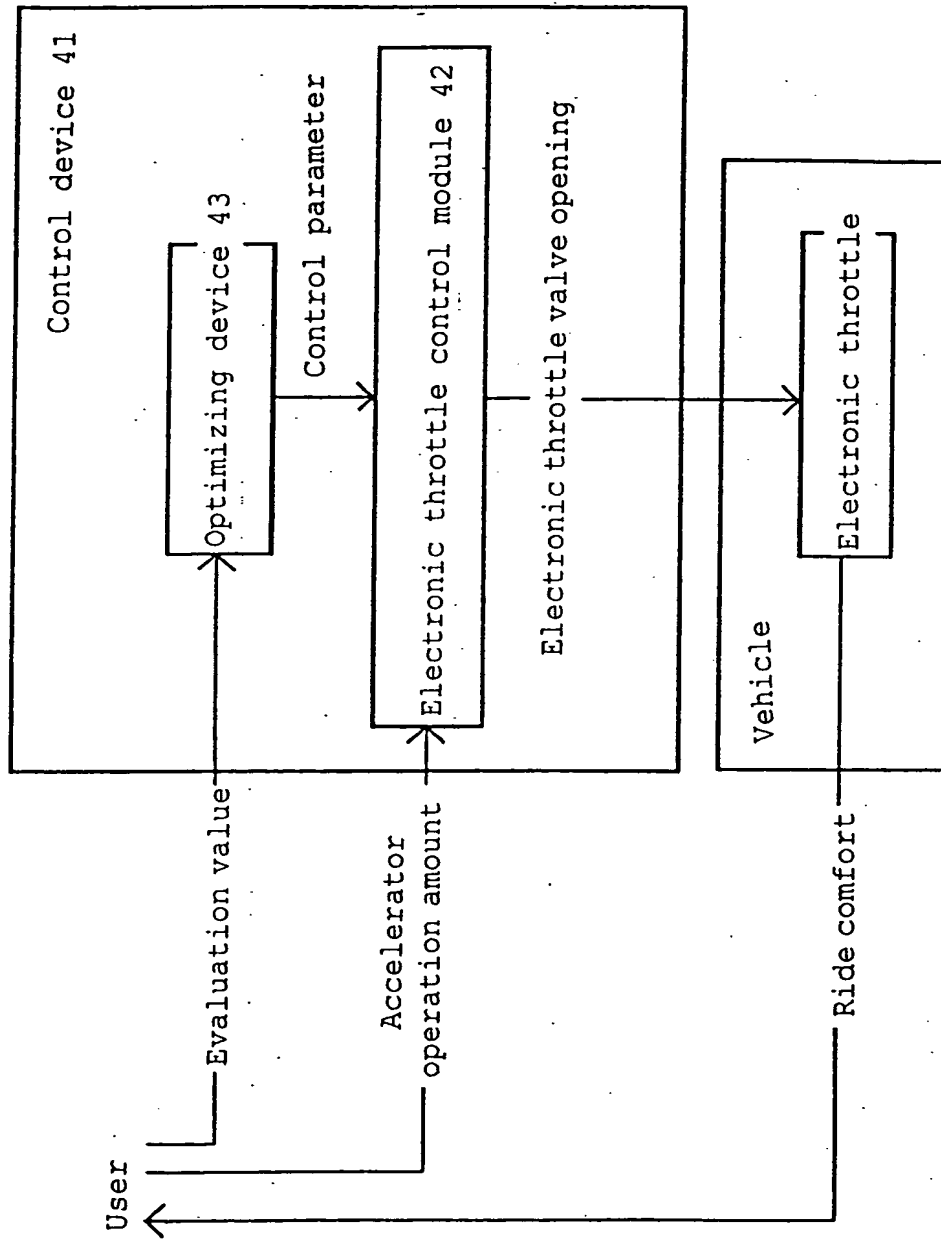
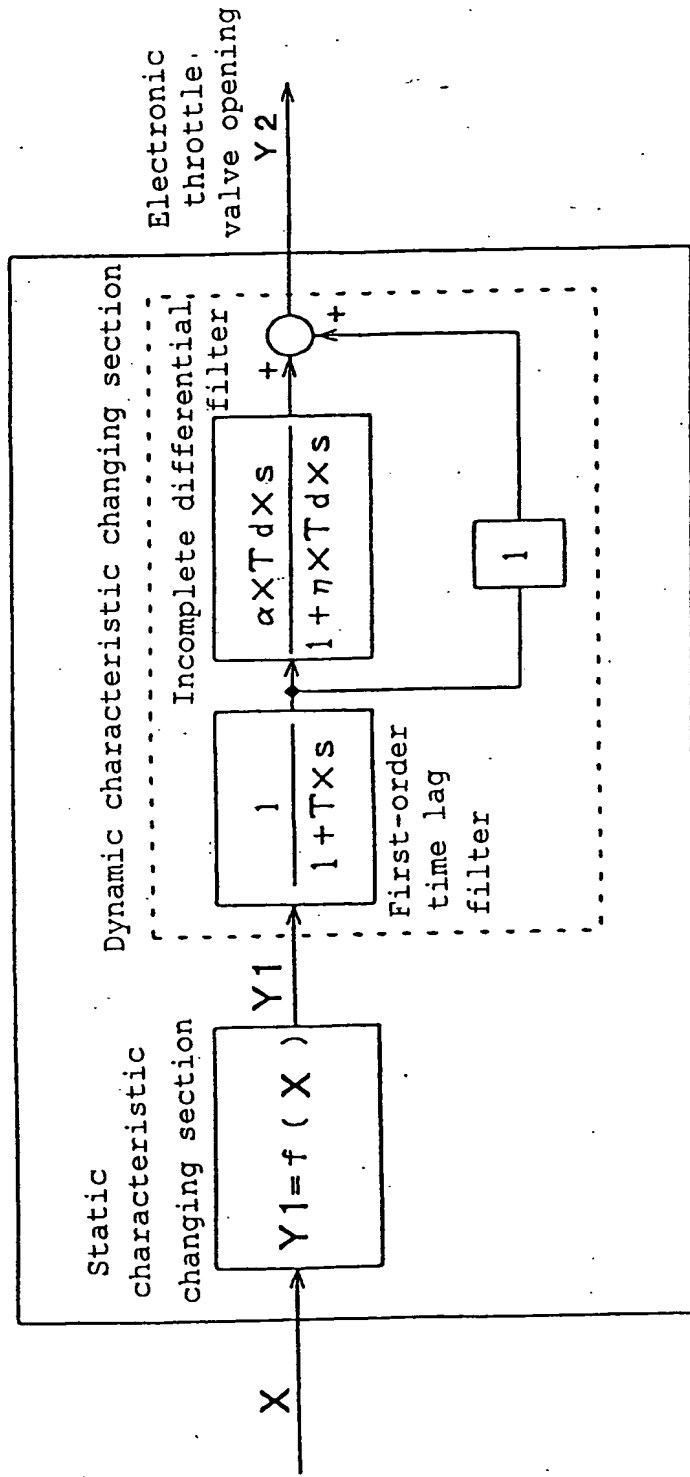


FIG. 14



- X : Accelerator opening T : First-order time lag constant (DR)
- $Y1$: Virtual electronic throttle opening T_d : Differential time
- $Y2$: Electronic throttle opening α : Acceleration compensation factor (AG)
- f : Static characteristic function η : Differential gain

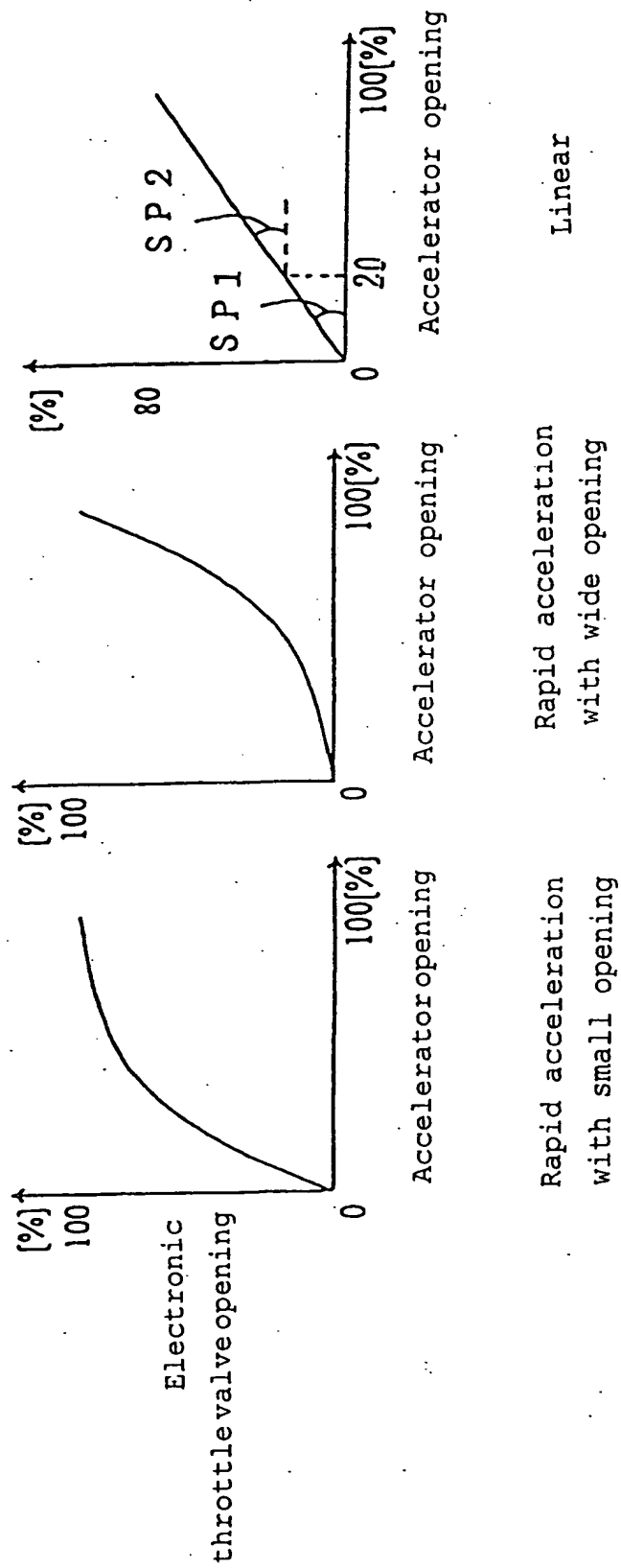


FIG. 15(a)

FIG. 15(b)

FIG. 15(c)

FIG. 16

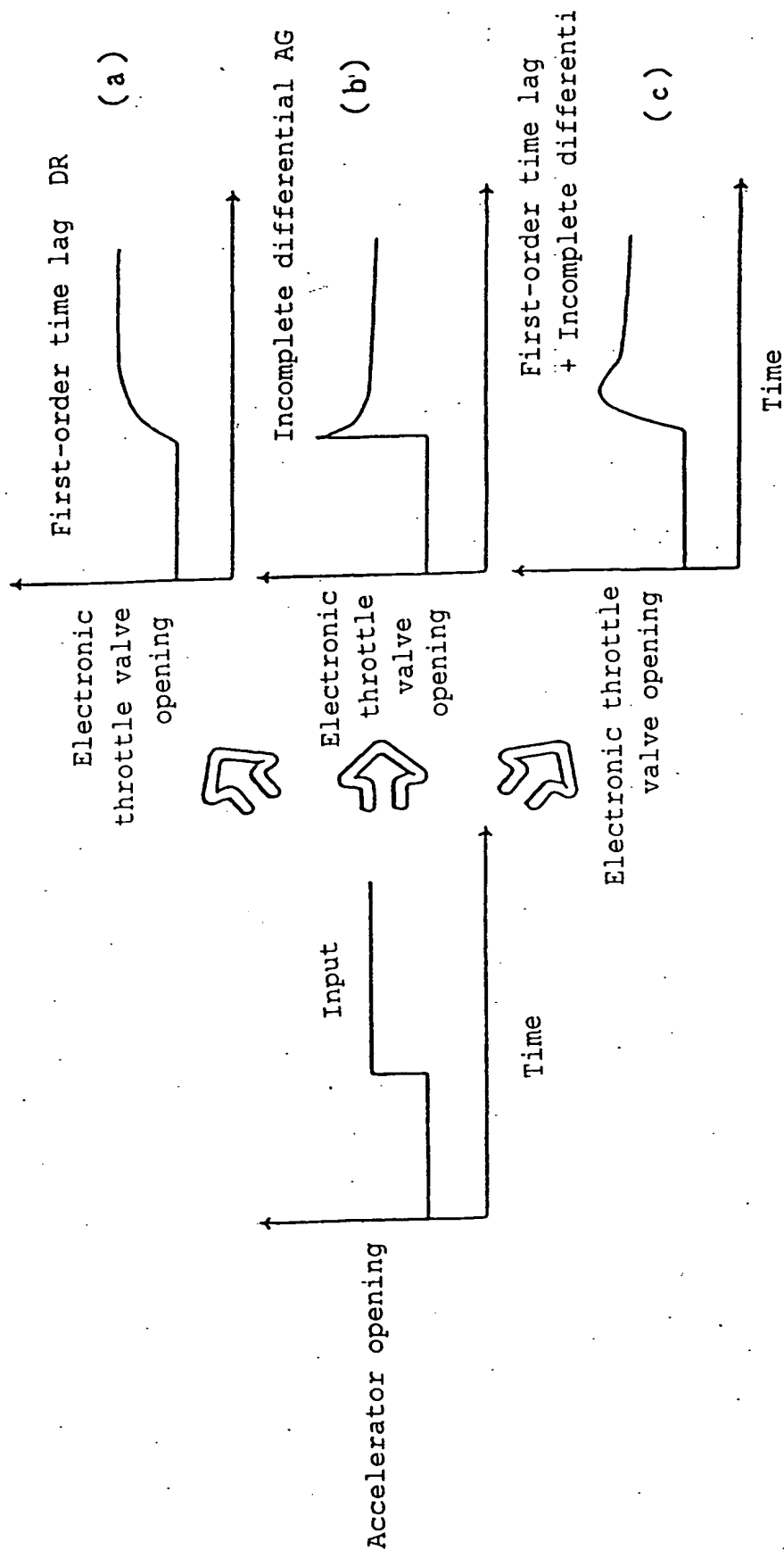


FIG. 17

SP ₁	SP ₂	DR	AG
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FIG. 18

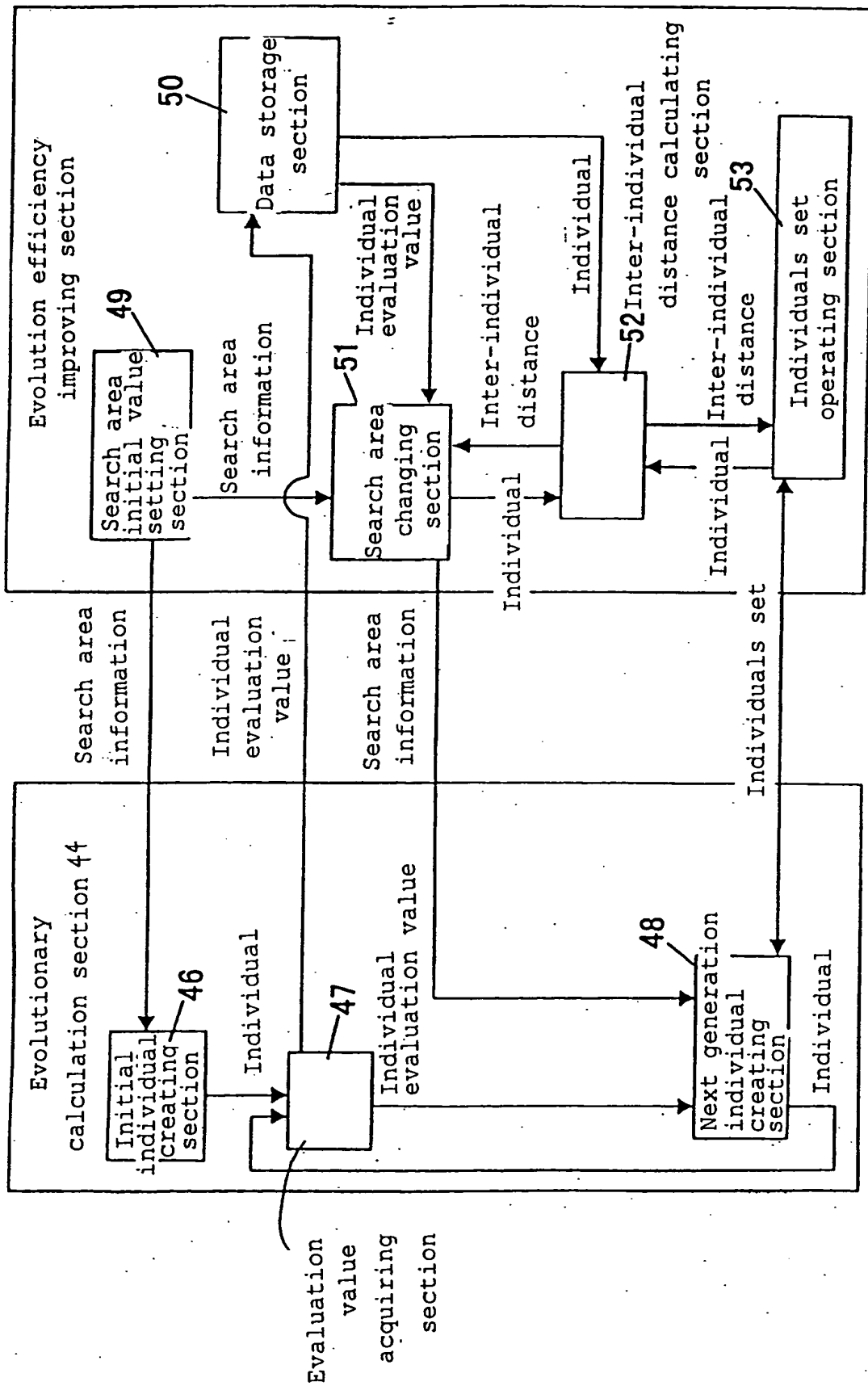


FIG. 19

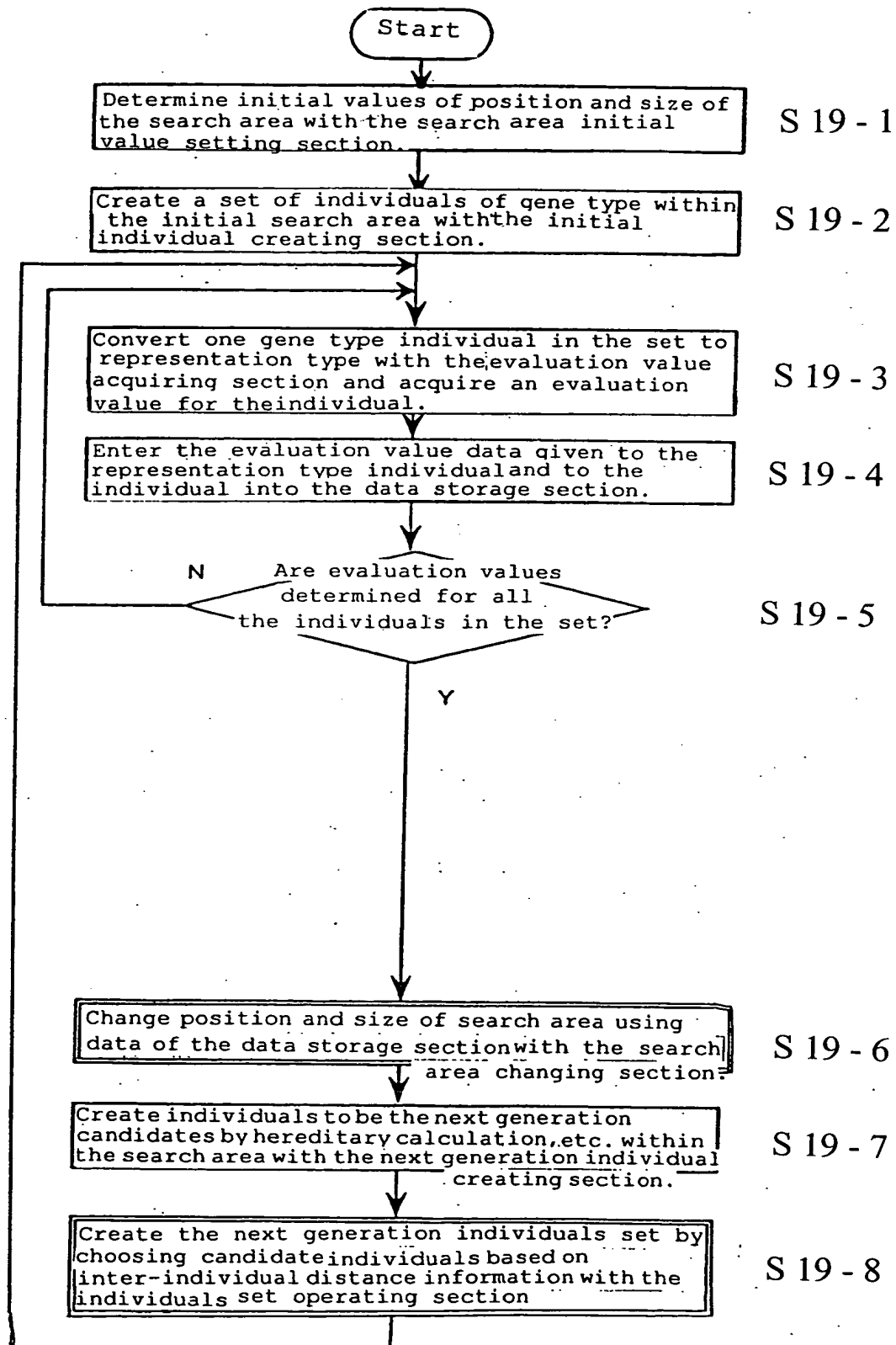
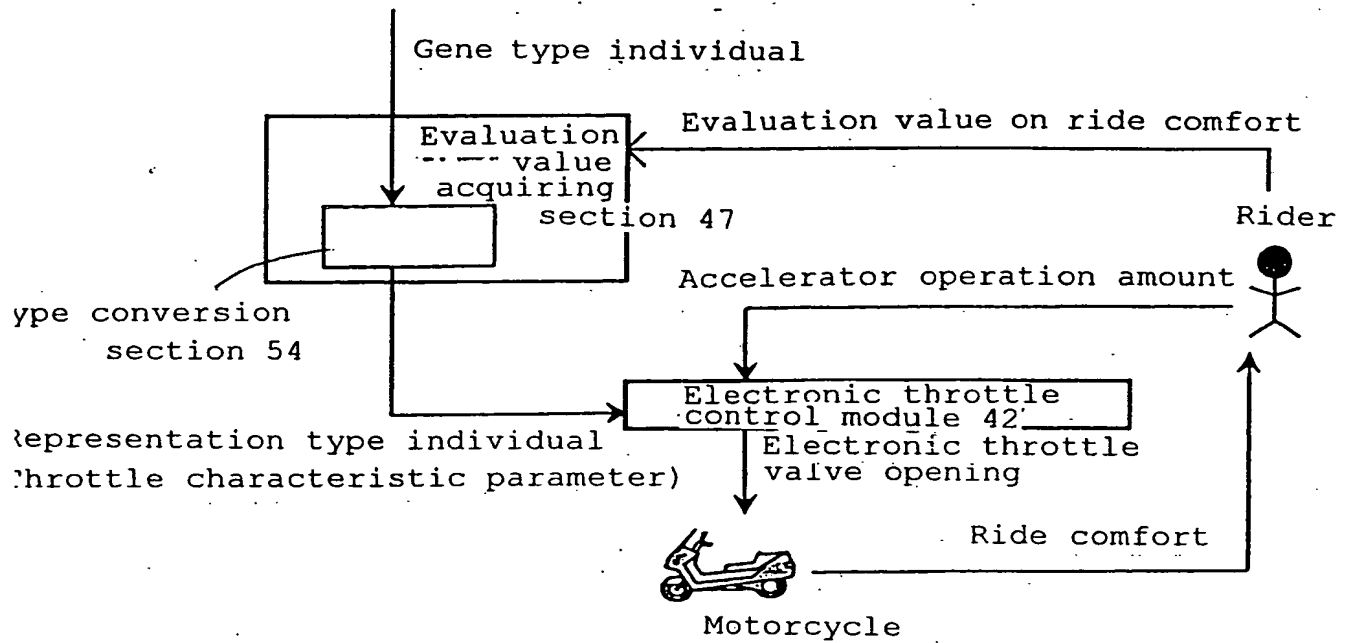


FIG. 20



①: Change by best evaluation value
 (Determine irrespective of current search area size)

FIG. 21(a)

Best evaluation value Y	Size of next generation search area (Center-to-edge distance)			
	SP1	SP2	DR	AG
$0 \leq Y < 50$	25	25	30	30
$50 \leq Y < 70$	20	20	25	25
$70 \leq Y < 90$	15	15	20	20
$90 \leq Y \leq 100$	10	10	15	15

②: Change by best evaluation value
 (Change based on current search area size)

FIG. 21(b)

Best evaluation value Y	Search area size (Amount of change in center-to-edge distance)			
	SP1	SP2	DR	AG
$0 \leq Y < 50$	+5	+5	+5	+5
$50 \leq Y < 70$	0	0	0	0
$70 \leq Y < 100$	-5	-5	-5	-5

FIG. 22

Create the next generation candidate individuals at constant intervals in all-inclusive manner within the search area.

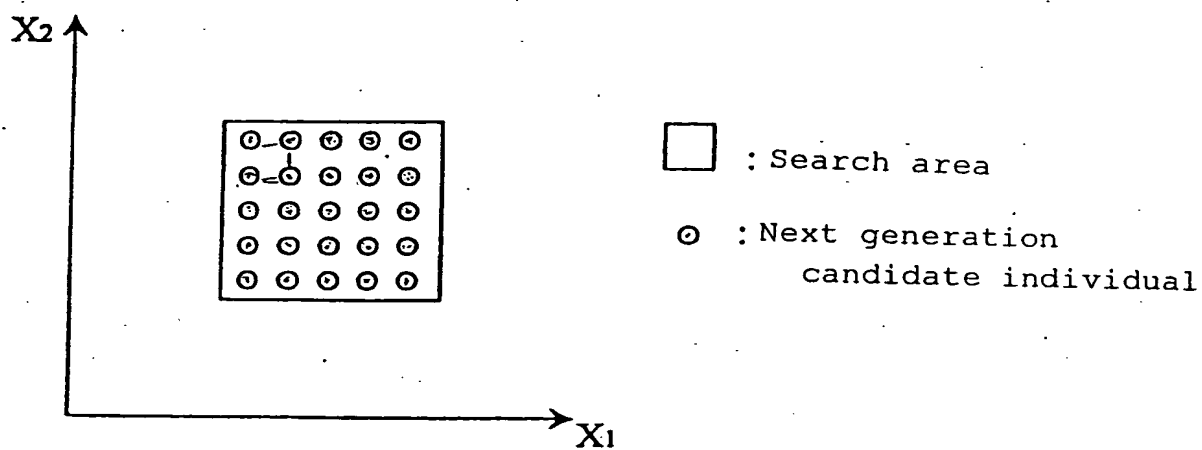


FIG. 23

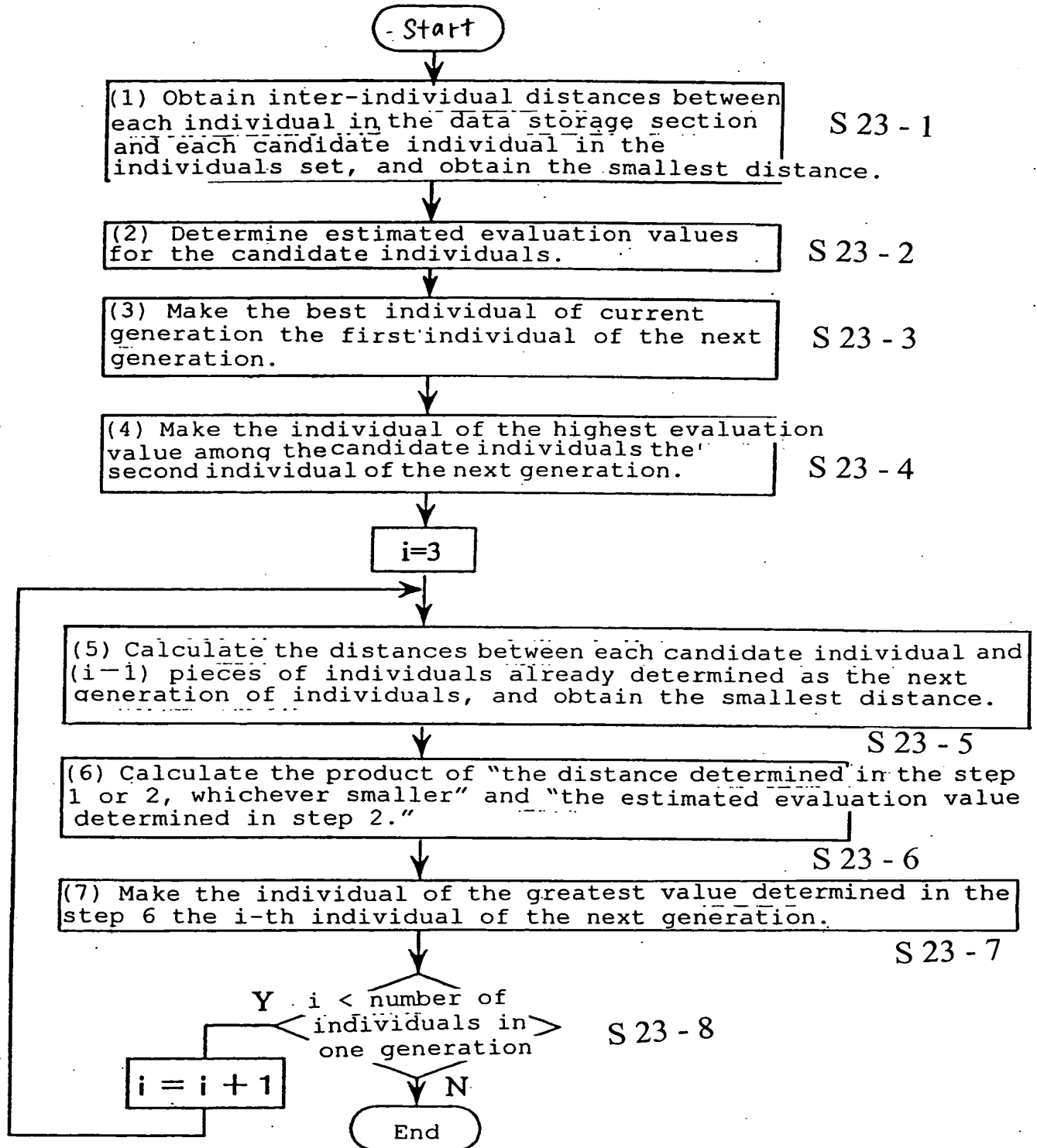
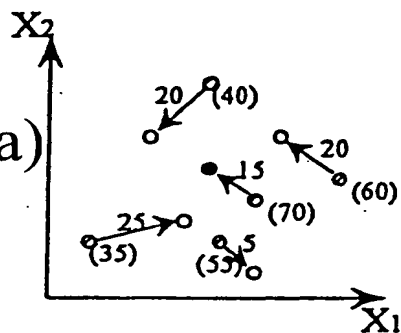


FIG. 24(a)



(60): Estimated evaluation value

○ : Individuals created so far.
(Individuals in the data storage section)

⊙ : Next generation candidate individuals

● : Individuals chosen for the next generation

→ 25 : Inter-individual distance

FIG. 24(b)

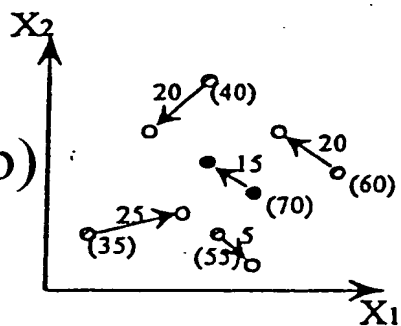


FIG. 24(c)

